

FCC MAIL SECTION

Before the
Federal Communications Commission
Washington, D.C. 20554

DISPATCHED BY
Docket No. 93-61

In the Matter of

Amendment of Part 90 of the
Commission's Rules to Adopt
Regulations for Automatic 16
Vehicle Monitoring Systems

RM-8013

NOTICE OF PROPOSED RULE MAKING

Adopted: March 11, 1993;

Released: April 9, 1993

Comment Date: June 29, 1993

Reply Comment Date: July 14, 1993

By the Commission: Commissioner Marshall not participating.

I. INTRODUCTION

1. By this Notice, we propose rules that will promote the efficient operation and continuing growth of Automatic Vehicle Monitoring (AVM) systems. These systems, which are now operating under interim rule provisions adopted in 1974,¹ will likely constitute important components of the future Intelligent Vehicle Highway System and tracking of cargo in the trucking, railroad, and maritime industry.² AVM systems are used to locate and track vehicles using non-voice methods and to relay information to and from vehicles. This proceeding is responsive to a petition for rule making filed by North American Teletrac and Location Technologies, Inc.,³ which, through their joint venture with Pactel Teletrac (Teletrac), operates several AVM systems. Based on the record before us,⁴ we are persuaded that AVM technology and experience have developed to a point where permanent provisions will further the public interest.

¹ Report and Order, Docket No. 18302, 30 RR 2d 1665 (1974) (Report and Order).

² In the Intermodal Surface Transportation Efficiency Act of 1991, Congress emphasized the importance of Intelligent Vehicle Highway Systems and provided substantial funding to plan, develop, and deploy concepts and technologies for communications, controls, navigation, and information systems to reduce highway congestion, improve highway safety, and render highway traffic more compatible with the environment. See generally reply comments of the Intelligent Vehicle Society of America (IVHS America).

³ The petition for rule making was filed on May 28, 1992, and designated RM-8013.

⁴ In response to our Public Notice, Report No. 1897, released

II. BACKGROUND

2. We first visited AVM policies in a *Notice of Inquiry* of August 21, 1968,⁵ seeking information on the state of development of such systems and the operational requirements they presented. Acknowledging the existence of several system designs, we decided that systems then under study would require a period of actual operation in a land mobile environment so that we could determine what designs would perform most effectively, what type of demand would exist for such services, and how we could license such systems to best serve the public interest.⁶ Hence we instituted an inquiry into AVM technology, providing as well for the authorization of AVM operations on a temporary experimental basis.

3. While our *Notice of Inquiry* elicited a "significant body of data,"⁷ these data did not permit conclusive findings and recommendations. Rather, the data indicated on the one hand that AVM technology had not developed sufficiently to justify permanent policies, but on the other that these systems had the potential to accommodate several radio communication requirements, such as tracking fleets of vehicles, monitoring the status of vehicles, and providing service to individuals in emergency situations, that could not be met easily within existing land mobile operations.⁸ Hence, four years after our original Notice, we re-instituted our inquiry, seeking information that would aid us in determining whether AVM systems should be authorized on a regular basis.

4. In the summer of 1974, we terminated our inquiry with a *Report and Order* adopting the interim rule now in effect.⁹ From the information before us, we concluded that AVM techniques had progressed to a point where systems could be authorized on a routine basis. The *Report and Order* recognized, however, that there are a variety of different methods of locating vehicles including proximity sensing, multilateration and dead reckoning, to serve the differing needs of users.¹⁰ We recognized that all these different methods and uses would need to be accommodated. Accordingly, we chose to adopt interim provisions, envisioning continuous study and development of AVM techniques to define spectrum requirements and operational standards for future action on our part.¹¹

5. Development of AVM systems has recently progressed to the point that a number of systems have become viable and are now providing AVM service. Demand has been demonstrated for the wide variety of services that different types of AVM systems are capable of providing,¹² and we anticipate that the demand for AVM services will continue to grow. In 1992, the Private Radio Bureau granted Teletrac a waiver to allow it to provide service on a private carrier basis, to serve individuals, and to locate objects

June 23, 1992, 19 comments and 35 reply comments were filed. These parties are listed in Appendix A to this Notice.

⁵ See Further Notice of Inquiry and Notice of Proposed Rule Making, Docket No. 18302, 35 FCC 2d 692 (1972) (Further Notice).

⁶ *Id.* at 692.

⁷ *Id.* at 693.

⁸ *Id.* at 693-4.

⁹ Report and Order, 30 RR 2d 1665 (1974).

¹⁰ *Id.*

¹¹ *Id.* at 1667, 1672.

¹² See generally comments and reply comments filed by AVM users in response to Teletrac's petition offering testimonial of the value of services being rendered by existing AVM systems.

other than vehicles.¹³ Teletrac has indicated that a demand exists for locating both animate and inanimate objects as well as for a fleet tracking capability and service to individuals in emergency situations.¹⁴ Additionally, increasing congestion on our nation's highways has led to greater demand for intelligent highway systems that better manage the flow of traffic. With their ability to track large numbers of vehicles and quickly relay information to and from vehicles, AVM systems will play an important role in enabling local governments to implement these intelligent highways. The automated nature of AVM systems will also reduce the cost to government agencies of operating facilities such as toll booths and weighing stations because such facilities will require dramatically reduced staff. Considering the multitude of benefits offered by AVM systems, it is imperative that our rules provide a competitive and dependable environment in which AVM systems can continue to develop.

III. DISCUSSION

6. In seeking permanent rules, Teletrac asserts, and commenters generally agree, that our interim rules by their very uncertainty impede development of and investment in AVM technology. Further, according to Teletrac, current provisions do not take into account the technical capabilities of AVM equipment, do not reflect the full range of services it can provide, and do not consider adequately the question of protection from harmful interference.¹⁵ Again, the comments indicate general agreement with this assessment of our provisions. At the same time, however, they do not agree on the merits of Teletrac's specific solutions to these problems. We consider, in this regard, first the definition of AVM, a subject of little controversy in the record. We then address spectrum allotment and licensing concerns, subjects on which the commenters are far from unanimous in their views.

Eligibility and Permissible Use

7. As discussed above, we believe that there is a growing demand for AVM services not only by businesses and local governments but also by individuals. Accordingly, we propose to expand the types of entities eligible to receive AVM service. Generally, Part 90 licensees may share the use of their facilities only with persons or entities that fall within various specific eligibility categories such as business, emergency organizations, land transportation entities, and state and local government agencies, for example. Individuals ordinarily are not eligible to share the facilities of a Part 90 licensee.¹⁶ We believe, however, that AVM services will be beneficial to the public in general and that providing service to the general public will not compromise a licensee's ability to provide location services to Part 90 eligibles.

Accordingly, we propose that Part 90 of the Commission's Rules be amended to permit an AVM licensee to provide service to individuals and the Federal Government as well as to Part 90 eligibles.

8. In addition to expanding the eligibility of end users we believe that the public interest would be served by expanding licensee eligibility to include private carriers. In accordance with Section 90.179 of the Rules, 47 C.F.R. § 90.179, only specialized mobile radio and private carrier paging licensees are permitted to provide service on a for-profit private carrier basis on frequencies above 800 MHz. All other licensees above 800 MHz are only permitted to share facilities on a cost sharing basis. Considering the often extensive infrastructure and high capacity of many AVM systems, we believe that it is appropriate to permit licensees to provide AVM service to others on a private carrier basis. Allowing this will permit licensing of entities with the financial and technological resources to provide state-of-the-art AVM services and will permit many individuals and smaller organizations that would be unable to support the cost of constructing a dedicated AVM system to obtain AVM service. Accordingly, we propose to expand licensee eligibility for AVM systems to include private carriers.

9. AVM systems are now limited to locating vehicles and to transmitting status and information related to the vehicles involved.¹⁷ Petitioner and commenters wish to expand this definition to include the location of all objects, animate as well as inanimate.¹⁸ We agree that the public benefit from position location systems would be greatly enhanced by permitting a wider variety of permissible uses. Accordingly, we propose to rename the AVM service as the Location and Monitoring Service (LMS) service and to define LMS as follows:

The use of non-voice signalling methods from and to radio units to make known the location of such units. LMS systems may also transmit and receive status and instructional messages related to the units involved.

This definition will give licensees the flexibility to use LMS systems to monitor or locate any object and will greatly expand the potential uses for such systems.¹⁹ Our expansion of permissible use and eligibility may, however, have its drawbacks. Increasing the potential uses for LMS services could lead to rapid congestion of available spectrum. We request comment on this proposal and on whether LMS systems and other entities currently occupying the 902-928 MHz band (*see* n.24) will be capable of handling any increased congestion.

¹³ Letter dated June 5, 1992, from the Chief, Private Radio Bureau to John B. Richards, Esq.

¹⁴ Teletrac petition at 6-14.

¹⁵ Petition at 15-19.

¹⁶ See Report and Order, PR Docket No. 86-404, 3 FCC Rcd 1838, 1840 (1988). See also Report and Order, PR Docket No. 89-45, 6 FCC Rcd 542 (1991).

¹⁷ See 47 C.F.R. §§ 90.7 and 90.239.

¹⁸ Petition at 20. Location Services (LS) comments at 5. MobileVision comments at 8. Southwestern Bell Corporation (SBC) comments at 2-4.

¹⁹ In its comments, MobileVision states that the last sentence

of this definition should be eliminated, claiming that it is redundant with operational requirements of AVM systems in 47 C.F.R. § 90.239. See MobileVision comments at 15. We disagree. The second sentence makes it clear that the transmission of information not directly related to locating an object is permissible, but that such transmissions must be limited to those related to objects being monitored or located. This should alleviate Amtech's concerns that the forward links operated as part of some AVM systems could potentially be used for purposes not connected with AVM. Amtech comments at 43. See para. 17, *infra*.

The 902-928 MHz Band

1. Spectrum Allotment/Licensing

10. How LMS spectrum in the 902-928 MHz band should be allotted is the subject of much contention in the comments. The interim rules divide the 902-928 MHz band into four sub-bands for AVM operation.²⁰ The 904-912 MHz and 918-926 MHz bands are assigned to licensees with AVM systems requiring up to eight megahertz.²¹ The other two bands, at 903-904 MHz and 926-927 MHz, are licensed only on a developmental basis for narrow-band type systems²² and to date there has been very little licensing activity in these bands. A number of licenses have, however, been granted on a non-exclusive basis in the 904-912 MHz and 918-926 MHz bands for both wide and narrow-band type systems.²³ These licenses have been granted without regard to the compatibility of co-channel systems, the method of operation of the AVM systems, or the operating bandwidth of the individual systems.²⁴

11. One form of AVM system currently operating in the 904-912 MHz and 918-926 MHz bands is the pulse-ranging multilateration system. In this type of system, a wide-band (up to eight megahertz) pulse is transmitted from the unit the licensee wishes to locate. The pulse is received at a number of fixed receiver locations. The difference in the time of arrival of the pulse at the various fixed locations is then used to calculate the location of the vehicle.²⁵ Various narrow-band systems are also operating in the 904-912 and 918-926 MHz bands.²⁶ In one of these types of systems an electronic device, generally referred to as a tag, is placed in or affixed to the object to be located. When the object passes near one of the system's stations, the station transmits an interrogating signal. The interrogating signal is either modulated with unit-specific information and reflected back to the station's receiver or the tag transmits its own signal in response to the interrogation. With either the pulse-ranging or narrow-band systems, status information or instructions can be transmitted to and from the unit being monitored or located. Generally, the pulse-ranging multilateration systems transmit a wide-band signal that is

from 4 to 8 megahertz wide, while narrow-band systems use a signal that is generally tens or hundreds of kilohertz wide.

12. The petitioner and most commenters operating or developing wide-band pulse-ranging systems argue that current practice, which permits narrow-band systems on the same spectrum as pulse-ranging systems, is unacceptable.²⁷ These commenters contend that the accuracy of a wide-band pulse-ranging location system is inversely proportional to the amount of co-channel noise in the system's vicinity. Although pulse-ranging systems are able to tolerate a limited amount of co-channel noise and still accurately locate objects, commenters claim, the narrow-band AVM systems currently being licensed raise this noise to intolerable levels and can render all or part of a pulse-ranging system useless.²⁸ Accordingly, these commenters seek to have narrow-band systems licensed on spectrum other than that used by wide-band pulse-ranging systems.²⁹

13. Commenters operating or developing narrow-band systems and one commenter that is developing a wide-band pulse-ranging system dispute these claims.³⁰ According to these commenters, it is only because of deficiencies in the design of most pulse-ranging systems that the systems can tolerate only a very limited amount of noise.³¹

14. Our review of this issue suggests that co-channel noise in the vicinity of a wide-band pulse ranging system does make it difficult, if not impossible, for the system to operate effectively. While we realize that there may be a number of ways to overcome at least a limited increase in co-channel noise, at this time we believe that these are generally not reasonable or cost-effective solutions. Accordingly, we propose that narrow-band LMS systems not be licensed on the bands currently occupied by wide-band pulse ranging LMS systems.

15. As stated previously, Section 90.239 permits licensing LMS systems on 18 megahertz of the 26 megahertz in the 902-928 MHz band.³² We propose to license LMS systems in the entire band. We propose that all narrow-band systems be licensed in the bands 902-904, 912-918, and 926-928 MHz and that all wide-band pulse-ranging systems

²⁰ See Section 90.239(c), 47 C.F.R. § 90.239(c).

²¹ See Section 90.239(c)(1).

²² Section 90.239(c)(2).

²³ Some waivers have also been granted to operate systems in the 912-918 MHz band.

²⁴ AVM systems operate on a secondary basis to Federal Government users and must also accept interference from Industrial, Scientific, and Medical devices. See 47 C.F.R. 90.239(c)(ii). Additionally, there are a number of users in this band that operate on a secondary basis to AVM operations. See, paras. 23 and 24 *infra*.

²⁵ The wide-band pulse can also be transmitted from the fixed locations in which case the time of arrival calculations would be performed by the units to be located.

²⁶ Amtech operates AVM systems that would be categorized as narrow-band. Amtech argues, however, that categorizing systems as narrow-band and wide-band is not appropriate. Amtech comments at 22. In using these broad categorizations we do not judge that one type of system is superior to another. We do believe, however, that in this instance, broadly classifying systems as either wide-band or narrow-band is necessary for licensing the different forms of LMS systems in a way that will allow them to co-exist in the 902-928 MHz band.

²⁷ See, Teletrac petition at 20-28, MobileVision comments at 9-14, LS comments at 3 and 4, and SBC comments at 3-6.

²⁸ See, Teletrac petition, Appendix 2, *Impact of Co-channel*

Interference on 900 MHz Wideband Pulse-Ranging AVM Systems. See also, MobileVision comments, Attachment A.

²⁹ The petitioner contends that the Commission always intended that AVM systems would be licensed on an exclusive basis, implying that the Licensing Division has erred in licensing systems on a non-exclusive basis. Petition at 20-24. We do not find sufficient evidence in any of the Commission's past proceedings or in the interim rules to support this claim. The interim rules were adopted at a time when very little information was available on AVM systems, including the demand for such services, or on the eventual technology that would be used to provide these services. The interim rules were, therefore, intended to promote the technological and marketplace development of AVM systems in general and to provide an environment of experimentation. To this end we believe that our licensing methods have reflected this intent. Additionally, at the time the interim rules were adopted there were no licenses being granted on an exclusive basis in the private land mobile services. Exclusive licenses were not adopted until May, 1974, in PR Docket 18262, 46 FCC 2d 752 (1974) and there is no evidence in the Report and Order that the Commission was contemplating applying such a new concept to the AVM service.

³⁰ See Pinpoint comments at 9-19, Amtech comments at 22-43, and Interagency comments at 6-8.

³¹ *Id.*

³² para. 8 *supra*.

be licensed in the bands 904-912 and 918-926 MHz. Because this spectrum is allocated on a primary basis for use by the Federal Government it will be necessary to coordinate use of the 902-903, 912-918, and 927-928 MHz bands for the LMS with the National Telecommunications and Information Administration (NTIA) prior to adoption of final rules.³³

16. With respect to the status of existing narrow-band systems in the 904-912 and 918-926 MHz bands, some commenters support grandfathering these systems,³⁴ while others argue that narrow-band systems not operate on spectrum used by wide-band pulse-ranging systems.³⁵ Given our proposed licensing scheme and the difficulties that wide-band pulse-ranging systems have co-existing with narrow-band systems, we believe it preferable to require narrow-band systems to migrate to the bands being proposed for their use. Accordingly, we propose that licensees currently authorized to operate narrow-band systems in either the 904-912 or 918-926 MHz bands be required to relicense their systems to operate on other spectrum within three years from the effective date of the Report and Order in this proceeding. We request comment on this proposal and, in particular, on the difficulties that existing narrow-band systems would encounter if required to move to different frequencies.

17. We also invite comment proposing alternative licensing schemes. For instance, if it is not possible to obtain authorization from NTIA to use the additional spectrum, is there a method wherein wide-band pulse ranging systems can effectively co-exist with narrow-band systems? Commenters are asked to discuss the maximum acceptable levels of co-channel noise for a shared environment and methods to limit noise to this acceptable level. In the alternative, it may be possible to restrict narrow-band transmissions to certain frequencies within the eight megahertz segments, thereby minimizing interference to the wide-band licensees. Additionally, commenters should address whether pulse-ranging LMS systems require eight megahertz and, if not, what minimum amount of spectrum is necessary to operate such a system.³⁶ Commenters should also address whether the amount of spectrum being proposed for narrow-band systems is sufficient to accommodate the future uses of these systems. The technology being used in AVM systems today is quite advanced and we would expect that licensees dedicated to operating cooperatively in a shared environment would be able to propose a method by which productive co-channel operations can be achieved. We therefore remain open to the possibility of an alternative licensing method.

2. Spectrum Allocation for Wide-Band Systems

18. If the 904-912 MHz and 918-926 MHz bands are reserved for wide-band pulse-ranging systems, we must determine which systems qualify for licensing. While we could, for example, require systems licensed in these bands to utilize the entire eight megahertz, we believe that a somewhat more flexible approach may be appropriate to promote efficient spectrum use. Accordingly, we propose that only pulse-ranging LMS systems having a bandwidth of at least two megahertz be licensed in the 904-912 MHz and 918-926 MHz bands. Systems requiring less than two megahertz would be licensed in the 902-904, 912-916, and 926-928 MHz bands. We request comment on this proposal and on whether any other limits, or no limits, would be preferable. We also note that the 2450-2483.5 MHz band is available for narrow-band systems and many are already designed to use that band.³⁷

19. Commenters indicate that wide-band pulse-ranging LMS systems require spectrum to contact units to be located (this is commonly referred to as a forward link).³⁸ Consistent with systems that are currently operating,³⁹ we propose that LMS systems operating in the 904-912 and 918-926 MHz bands be authorized to use 250 kHz of spectrum to establish forward links as follows: licensees in the 904-912 MHz band would use 924.890-925.140 MHz and licensees in the 918-926 MHz band would use 904.375-904.625 MHz. These links could be used only in conjunction with units being located, but no other limits would be placed upon them. Licensees would be able to divide the 250 kHz as required to satisfy their needs.

20. We request comment on our proposal for forward links, including whether it would be better to move the forward links to the edges of the 8 MHz bands,⁴⁰ or whether a licensee should use the forward links located in its own eight megahertz band rather than using the forward link channels that are located in the other eight megahertz band.

3. Licensing of Wide-band Systems

21. We have proposed that only wide-band pulse ranging LMS systems be licensed in the 904-912 MHz and 918-926 MHz bands. The petitioner and some commenters claim that such systems must be licensed on an exclusive basis (one licensee per band in any one geographic area) to operate effectively and to promote further development of

³³ Additionally, Radian Corp. has filed a petition for rule making, RM-8092, requesting that the 914-916 MHz band, later amended to 908.75-912.25 MHz (see NOI at n.6), be allocated on a secondary basis to government radiolocation services for non-government wind profiler radar systems. See, Notice of Inquiry, Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum for Wind Profiler Radar Systems, (NOI), ET Docket 93-59, on this issue was adopted March 10, 1993. Any Commission action in response to RM-8092 will take into consideration spectrum and licensing requirements that will be adopted in this proceeding.

³⁴ Teletrac petition at 35, MobileVision comments at 17 and 18. SBC suggests that more information on the effect of grandfathering any systems is required. SBC comments at 6.

³⁵ LS comments at 4.

³⁶ MobileVision has been especially adamant that pulse-ranging systems require the full eight megahertz while SBC has sug-

gested that smaller assignments would be acceptable. MobileVision comments at 13. SBC comments at 3.

³⁷ See, 47 C.F.R. § 90.75. Private land mobile use of this band is not, however, limited to LMS systems and LMS systems operating in this band would not be able to take advantage of the expanded licensee and end user definitions we are proposing herein. See paras. 7-9 *supra*.

³⁸ Teletrac petition at 21 and 22. SBC comments at 4. MobileVision comments at 14. LS comments at 4 and 5. Pinpoint agrees that a forward link is necessary but disagrees that separate dedicated spectrum is required. Pinpoint claims that its AVM system incorporates a forward link in the same channel used for vehicle location and that other AVM licensees should also be required to do so. Pinpoint comments at 20-22.

³⁹ See Teletrac petition at 20-22.

⁴⁰ LS supports locating the forward links at the edges of the bands. LS comments at 4.

the LMS industry.⁴¹ The record does not appear to support this view. As IVHS America points out, the exclusive use of 8 MHz-wide assignments will lead to a higher cost to the public both in terms of use of the spectrum and in terms of cost for subscribing to an LMS service (because of decreased competition).⁴² We believe it possible for wide-band pulse-ranging systems to operate on a non-exclusive basis, albeit with cooperation among co-channel licensees serving the same area. We further believe that non-exclusive licensing of LMS systems is the best means to promote competition within the LMS industry and continued technological advances in LMS services, possibly leading to more robust systems and more efficient spectrum sharing. If we were to grant exclusive licenses in these bands, we might effectively eliminate any further entrants into LMS services in these bands in many areas of the country because of the extensive number of licenses currently issued, ultimately resulting in limiting the number of licensees to two in all areas of the country.⁴³

22. Assuming that sharing of this spectrum is feasible, we have developed two possible approaches to future licensing. One approach would be to license wide-band pulse ranging systems on a non-exclusive basis in the 904-912 and 918-926 MHz bands assuming we determine sharing is *immediately* feasible. Under this approach coordination to avoid interference among co-channel users would be performed by the licensees themselves. Under another approach, we could take steps to protect licensees that are currently authorized in the 904-912 and 918-926 MHz bands or in the markets not currently licensed, protect the first two wide-band licensees for five years. Specifically, we could continue to license stations on the 904-912 and 918-926 MHz bands but require all new applicants for these bands, after the effective date of a Report and Order in this proceeding, to be located at least 110 miles from all previously licensed, co-channel stations.⁴⁴ After a five-year period, licenses could be granted for wide-band systems on a non-exclusive basis and with no co-channel mileage separation. Licensees issued authorizations after the five-year period would, however, be required to protect any previously licensed co-channel wide-band stations.⁴⁵ We request comment on our proposals and invite alternative proposals that commenters believe would better serve the public interest and provide for competition and development within the LMS industry.

23. While it may be necessary for co-channel licensees to coordinate among themselves to enable effective wide-band sharing, there are also additional users of this band that must be considered. The primary allocation for the 902-928

MHz band is for Federal Government Radiolocation, Fixed and Mobile services;⁴⁶ additionally, LMS systems must accept interference from Industrial, Scientific, and Medical (ISM) devices under Part 18 of the Commission's Rules.⁴⁷ On a secondary basis to LMS systems, this band is also/allocated for use by unlicensed devices under Part 15 of the Commission's Rules,⁴⁸ as well as by amateur radio operations in accordance with Part 97 of the Rules.⁴⁹ Commenters have indicated that, thus far, interference received from government radar systems or ISM equipment has not been a problem. Licensees, however, must remain aware that such interference from the primary services is possible and, as LMS systems become more prevalent, that the possibility of interference will increase.

24. In contrast, however, interference to LMS systems from Part 15 users, amateur operators, and Government Radiolocation, Fixed and Mobile stations is a more likely scenario that must be addressed. Some LMS systems have already experienced interference from Part 15 devices. This will likely be a continual concern as new consumer-oriented Part 15 devices, including the new spread spectrum cordless telephones, which can operate with up to one watt, are introduced.⁵⁰ Although such devices operate on a secondary basis to LMS systems, LMS licensees could require some time to identify a source of interference and take action to eliminate the problem. As LMS systems are being marketed to public safety entities such as police and ambulance services, this potential interference is of special concern.⁵¹ We request comment from LMS operators regarding measures that should be taken to protect against potentially life-threatening failures of LMS systems due to interference from other, lower priority users of the band. Of particular interest are measures that have already proven effective in preserving the reliability of LMS systems. One measure that we propose is to alert LMS customers to the possibility of such interference, and its effect on service quality or reliability, by requiring that all, instruction manuals, operator manuals, and brochures for LMS devices sold have a warning similar to that required for Part 15 devices in accordance with Section 15.19(a)(3) of our Rules, 47 C.F.R. § 15.19(a)(3). Our proposed warning reads as follows:

"This device complies with Part 90 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference to Federal Government operations using this spectrum and (2) this device must accept any interference re-

⁴¹ Teletrac petition at 24-32. MobileVision comments at 10 and 11. LS comments at 3.

⁴² Reply comments of IVHS America.

⁴³ A number of commenters have raised this issue. See Pinpoint comments at 22-25 and Amtech comments at 37-40.

⁴⁴ In some areas co-channel systems that are already licensed will be separated by less than 110 miles. In such situations the licensees will be required to share on an equal basis.

⁴⁵ We emphasize that any entities granted a license to operate on the 904-912 or 918-926 MHz bands after the adoption date of this Notice of Proposed Rule Making and prior to the effective date of a Report and Order in this proceeding will be required to construct and place their system in operation within 8 months of the date the license is granted, as currently required by Section 90.155 of our Rules.

⁴⁶ See Section 2.106, 47 C.F.R. § 2.106.

⁴⁷ See Section 18.305, 47 C.F.R. § 18.305.

⁴⁸ See Sections 15.247, 15.243, 15.245, and 15.249, 47 C.F.R. §§ 15.247, 15.243, 15.245, and 15.249.

⁴⁹ See Section 97.301, 47 C.F.R. § 97.301.

⁵⁰ See Section 15.247, 47 C.F.R. § 15.247. Cylink Corporation (Cylink), a developer of Part 15 equipment, submitted late-filed comments on February 8, 1993, regarding the co-existence of Part 15 devices and AVM systems. Cylink provides a copy of a letter sent by Teletrac to one of Cylink's customers informing the customer of interference its Part 15 device is causing to Teletrac's AVM system, and informing the customer that it must remove the device from the 904-912 MHz band. Cylink contends that such interference will become more routine in the future and asserts that the Commission should take action to provide Part 15 users greater rights when operating in the 902-928 MHz band.

⁵¹ See petition at 12-15.

ceived from Federal Government operations and from Industrial, Scientific, and Medical devices using this spectrum, including interference that may cause undesired operation."

Commenters should address whether they believe it possible to establish reliable LMS systems considering the number and diversity of other users of this band. If not, commenters should offer potential solutions, such as removing Part 15 users and amateur operations from the band, restricting where such users could operate in the band, or placing stricter limitations on the operation of such users in this band.

4. Narrow-Band Licensing

25. We propose that narrow-band LMS systems (any system licensed in the 902-904, 912-918, 926-928 MHz bands) also be licensed on a nonexclusive basis, with coordination performed by the licensees to avoid interference. Some commenters operating and developing narrow-band systems claim that their systems are more robust than are wide-band systems and are therefore not as susceptible to interference.⁵² We thus propose that no restrictions be placed on the type or number of systems operating in these bands. We request comments on this proposal and whether, in the alternative, some form of restriction is appropriate. Because these systems are also subject to the interference concerns discussed above, we request comment on whether some form of warning to consumers should be required for narrow-band LMS systems.

5. Construction Period

26. Currently, LMS licensees must construct and place their systems in operation within eight months from the date the license is granted.⁵³ The petitioner and some commenters support extended implementation schedules for LMS systems that employ numerous base stations and receive sites.⁵⁴ Except for local government entities,⁵⁵ we currently have no provision for extended implementation of radio systems that operate on shared channels, and we are not inclined to introduce such a concept in this service.⁵⁶ We do not believe that systems operating on shared spectrum require an extended period to construct their facilities. Because the channels are shared, a licensee need not apply at the outset for all the facilities it intends to construct. Rather, it can apply when it is ready to begin construction on an individual facility. Further, we do not want frequencies to appear more congested than they really are because of licensees that do not construct. If we grant extended implementation, unconstructed licenses could remain active for up to five years rather than being cleared

from the database after eight months. Accordingly, we propose to retain the eight month construction and placed in operation requirement.

LMS Below 512 MHz

27. Section 90.239, 47 C.F.R. 90.239, provides for LMS systems on frequencies below 512 MHz. We have not received any comments regarding such systems. We propose that no changes be made to the rules regarding LMS systems below 512 except that our proposed definition for LMS would apply there as well. Such licensees would not, however, be permitted to provide service to individuals or to provide service on a private carrier basis. We believe such a restriction is appropriate in bands below 512 MHz given their primary use as private land mobile communication channels, not for radiolocation purposes. We request comment on this proposal and on any changes that might be appropriate for LMS systems operating in these lower bands.

Technical Requirements

28. Currently, transmitters used in LMS systems above 512 MHz do not have to be type accepted, provided that they meet the technical requirements of Section 90.239(e)(2).⁵⁷ Several commenters support requiring that equipment used for LMS systems be type accepted.⁵⁸ LS states, however, that such a requirement would be prohibitive for licensees in the early stages of equipment development and requests that licensees be permitted to operate new systems for 18 months before they are required to get their equipment type accepted.⁵⁹

29. In that we are proposing permanent rules for LMS systems, we believe that equipment should receive type acceptance prior to use. As LMS systems become more wide spread, and because such systems will be licensed on a nonexclusive basis, it will be increasingly important to LMS licensees and users that new equipment comply with required technical standards. Accordingly, we propose to require that LMS equipment be type accepted prior to marketing and use.⁶⁰

30. We propose a number of technical requirements for LMS systems to minimize the possibility of both co-channel and adjacent-channel interference. We propose that no restriction be placed on the type of emission that can be authorized for LMS operation in the 902-928 MHz band.⁶¹ We propose bandwidth limits as follows:

for 904-912 and 918-926 MHz --	maximum 8 MHz
for 902-904 and 926-928 MHz --	maximum 2 MHz
for 912-918 MHz	-- maximum 6 MHz.

⁵² Amtech comments at 10 and 36.

⁵³ See Section 90.155, 47 C.F.R. § 90.155.

⁵⁴ Teletrac petition at 33. MobileVision comments at 16.

⁵⁵ See Section 90.155(b), 47 C.F.R. § 90.155(b).

⁵⁶ Any waivers granted by the Licensing Division to permit extended implementation will, however, remain in effect. Pending a Report and Order in this proceeding, we do not anticipate granting any new waivers of the eight-month construction requirement absent extraordinary circumstances. Additionally, because of the scope of this proceeding all AVM licensees should be aware that final rules adopted may require any licensee,

regardless of the type of system of frequencies that the system operates on, to modify its operations.

⁵⁷ See 47 C.F.R. § 90.239(e)(2).

⁵⁸ Teletrac petition at 17. MobileVision comments at 14.

⁵⁹ LS comments at 2.

⁶⁰ Licensees still in the developmental stages that do not wish to seek type acceptance may be licensed on a developmental basis in accordance with subpart Q of Part 90 of our Rules, 47 C.F.R. Part 90 Subpart Q.

⁶¹ See Section 2.201 of the Rules, 47 C.F.R. § 2.201, for a description of emission designators.

We propose the frequency tolerance for transmitters in the 904-912 and 918-926 MHz bands to be 0.0005 percent and that no minimum frequency tolerance be established for transmitters in the 902-904, 912-918, and 926-928 MHz bands. The frequency tolerance for these systems would be specified on the station's authorization. We propose a maximum peak effective radiated power for any LMS systems operating in the 902-928 MHz band of 300 watts. Finally, we propose that emissions anywhere within the authorized bandwidth not be required to be attenuated but that any emissions outside of the authorized bandwidth be attenuated by at least $55 + 10\log(P)$ dB where P is the highest emission (in watts) of the transmitter inside the authorized bandwidth. We request comment on the proposed technical limitations, especially, whether it would be appropriate to require that systems, particularly wide-band systems operating in the 904-912 and 918-926 MHz bands, evenly distribute power throughout their authorized band. If such a requirement is appropriate commenters should be specific as to how such a requirement should be implemented. Additionally, comments are specifically sought on whether a frequency tolerance should be specified for narrow-band systems and, if so, what the frequency tolerance should be.

IV. CONCLUSION

31. We propose rules for the LMS service that will replace interim rules now in effect. We propose, first of all, to expand the service to encompass location of all objects, animate and inanimate, and to allow licensees to provide service on a private carrier basis to individuals, the Federal Government, and Part 90 eligibles. Further, we propose locating wide-band pulse-ranging LMS services in the 904-912 MHz and 918-926 MHz bands, and narrow-band LMS services in the 902-904 MHz, 912-918 MHz, and 926-928 MHz bands. All licensees would operate on a shared-frequency basis and would be expected to cooperate with other licensees to resolve any harmful interference. Narrow-band licensees currently operating on frequencies designated for wide-band use would have to relocate their systems within three years of the effective date of our final action. The proposed rules will foster continued development of the LMS service, while maintaining an open and competitive marketplace. LMS services will greatly benefit the public interest by promoting more intelligent use of our nation's highways and more efficient use of scarce resources.

V. PROCEDURAL MATTERS

Regulatory Flexibility Act

32. An Initial Regulatory Flexibility Analysis is contained in Appendix B to this *Notice of Proposed Rule Making*. As required by Section 603 of the Regulatory Flexibility Act, the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the expected impact on small entities of the proposals suggested in this document. The IRFA is set forth in Appendix B. Written public comments are requested on the IRFA. These comments must be filed in accordance with the same filing deadlines as comments on the rest of the *Notice*, but they must have a separate and distinct heading designating them as responses to the Initial Regulatory Flexibility Analysis. The Secretary shall send a copy of this *Notice of Proposed*

Rule Making, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration in accordance with paragraph 603(a) of the Regulatory Flexibility Act. Pub. L. No. 96-354, 94 Stat. 1164, 5 U.S.C. § 601 *et seq.* (1981).

Ex Parte Rules - Non-Restricted Proceeding

33. This is a non-restricted notice and comment rule making proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in Commission rules. See generally 47 C.F.R. §§ 1.1202, 1.1203, and 1.1206(a).

Comment Dates

34. Pursuant to applicable procedures set forth in Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before **June 29, 1993**, and reply comments on or before **July 14, 1993**. To file formally in this proceeding, you must file an original and four copies of all comments, reply comments, and supporting comments. If you want each Commissioner to receive a personal copy of your comments, you must file an original plus nine copies. You should send comments and reply comments to Office of the Secretary, Federal Communications Commission, Washington, DC 20554. Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center, Room 239, 1919 M Street, N.W., Washington, DC 20554.

Ordering Clause

35. Authority for issuance of this *Notice of Proposed Rule Making* is contained in Sections 4(i), 302, 303(g), 303(r), and 332(a) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(g), 303(r), and 332(a).

Contact Person

36. For further information concerning this proceeding, contact Steve Sharkey, Private Radio Bureau, (202) 634-2443.

FEDERAL COMMUNICATIONS COMMISSION

Donna R. Searcy
Donna R. Searcy
Secretary *WFC*

APPENDIX A

Parties Filing Comments

1. Allen-Bradley Company, Inc.
2. American President Company
3. American Trucking Association
4. Amtech Corporation
5. Amtech Logistics Corporation
6. Association of American Railroads
7. Conrail
8. Greater New Orleans Express
9. Location Services
10. Los Angeles County Office

11. Los Angeles Dept. of Airports
12. LTV Missile Group
13. Mark IV IVHS Division
14. Mobilevision
15. Niles Police Department
16. Oklahoma Turnpike Authority
17. Pinpoint Communications, Inc.
18. Riverside Transit Agency
19. Southwestern Bell Corp.

Parties Filing Reply Comments

1. Ambulance Service Corp.
2. Amtech Corporation
3. Bedford Motor Service
4. CCTC International Inc.
5. City Haul, Inc.
6. City of Evanston Police
7. City of Farmington Hills
8. City of Santa Monica California
9. Core-Mark
10. Courtesy Services
11. Dependon Messenger and Trucking
12. GTECH Corporation
13. Intelligent Vehicle Highway Society of America
14. Jewel Food Stores
15. Location Services
16. Los Angeles Bureau of Investigations
17. Los Angeles County Office of Education
18. Mark IV IVDS Division
19. Mercy Ambulance Service
20. Michigan Department of Police
21. Missile Group Old Crows
22. Mobilevision
23. North American Teletrac
24. North Richland Hills Police
25. Oak Lawn Police
26. Oakland County Sheriff's
27. Paramed Inc.
28. Pinpoint Communications
29. Progressive Concepts, Inc.
30. Riverside Transit Agency
31. Rolling Meadows Police
32. Solon Automated Services
33. Southern Wine & Spirits
34. Southwestern Bell Corp.
35. Wrag-Time

Parties Filing Late-Filed Comments

1. Cylink Corporation
2. Stanford Telecommunications, Inc.

APPENDIX B

INITIAL REGULATORY FLEXIBILITY ANALYSIS

1. *Reason for Action:* The changes, proposed herein, to Part 90 of the Commission's Rules will enhance use of the 902-928 MHz band for automatic vehicle monitoring (AVM) systems. The proposed permanent rules will replace the existing interim rules, thereby creating a more stable environment for AVM systems to operate in. This should lead to investment in AVM technology a development and implementation of new AVM systems.

2. *Objectives:* The Commission seeks to promote development of a competitive and innovative AVM service in the 902-928 MHz band. Such a service will provide valuable new advanced location options to the public.

3. *Legal Basis:* The legal basis for these rule changes is found in Sections 4(i), 302, 303(g), 303(r), and 332(a) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 302, 303(g), 303(r), and 332(a).

4. *Reporting, Recordkeeping, and Other Compliance Requirements:* AVM licensees will be required to have equipment type accepted prior to its use. Additionally, some licensees currently operating AVM systems in the 904-912 and 918-926 MHz bands will be required to relicense their systems in the 902-904, 912-918, or 926-928 MHz bands.

5. *Federal Rules Which Overlap, Duplicate or Conflict With These Rules:* None.

6. *Description, Potential Impact, and Number of Small Entities Involved:* Many small entities could be positively affected by this proposal because additional AVM options would be made available to them. The number of small entities that will be affected is unknown. Additionally, expanded service opportunities will generate a demand for new AVM equipment, a benefit for equipment manufacturers.

7. *Any Significant Alternatives Minimizing the Impact on Small Entities Consistent with the Stated Objectives:* This Further Notice solicits comments on a variety of alternatives. Additionally, all significant alternatives presented in response to the petition for rule making have been addressed in this *Notice of Proposed Rule Making*.

APPENDIX C

A. Part 2 of Chapter 1 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

PART 2 - FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for Part 2 continues to read as follows:

Authority: Sec. 4, 302, 303, and 307 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154, 154(i), 302, 303, 303(r), and 307, unless otherwise noted.

2. Section 2.106 is amended by adding "Private Land Mobile (90)" to the FCC use designators in the row for 902-928 MHz in the table and by revising footnotes US218 and US275 to read as follows:

§ 2.106 Table of Frequency Allocations

* * * * *

International table	United States table		FCC use designators	Special-use frequencies
* * *	Government	Non-Government	Rule part(s)	
* * * * *				
* * *	902-928 RADIOLOCATION	902-928	Private Land Mobile (90). Amateur (97).	915 ± 13 MHz Industrial, scientific, and medical frequency.
	707	707		
	US215 US218	US215 US218		
	US267 US275	US267 US275		
	G11 G59			

* * * * *

US218 The band 902-928 MHz is available for Location and Monitoring Service (LMS) systems subject to not causing harmful interference to the operation of all Government stations authorized in these bands. These systems must tolerate interference from the operation of Industrial, scientific, and medical (ISM) devices and the operation of Government stations authorized in these bands.

US275 The band 902-928 MHz is allocated on a secondary basis to the amateur service subject to not causing harmful interference to the operations of Government stations authorized in this band or to Location and Monitoring Service (LMS) systems. Stations in the Amateur service must tolerate any interference from the operations of industrial, scientific, and medical (ISM) devices. LMS systems and the operations of Government stations authorized in this band. Further, the Amateur Service is prohibited in those portions of Texas and New Mexico bounded on the south by latitude 30°41' North, on the east by longitude 104°11' West, and on the north by latitude 34°30' North, and on the west by longitude 107°30' West; in addition, outside this area but within 150 miles of these boundaries of White Sands Missile Range the service is restricted to a maximum transmitter peak envelope power output of 50 watts.

* * * * *

B. Part 90 of Chapter 1 of Title 47 of the Code of Federal Regulations is proposed to be amended as follows:

PART 90 - PRIVATE LAND MOBILE RADIO SERVICES

1. The authority citation for Part 90 continues to read as follows:

Authority: Secs. 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303, and 332, unless otherwise noted.

2. Section 90.7 is amended by removing the entry for *Automatic Vehicle Monitoring* and adding a new definition for *Location and Monitoring Service* to read as follows:

§ 90.7 Definitions.

* * * * *

Location and Monitoring Service (LMS). The use of non-voice signalling methods from and to location units to make known the location of such units. LMS systems may also transmit status and instructional messages related to the units involved.

* * * * *

3. Section 90.101 is revised to read as follows:

§ 90.101 Scope.

The Radiolocation Service accommodates the use of radio methods for determination of direction, distance, speed, or position for purposes other than navigation. Rules as to eligibility for licensing, permissible communications, frequency available, and any special requirements are set forth in sections 90.103 and 90.105.

4. Section 90.103 is amended by adding 902-928 MHz to the Table in paragraph (b), by adding new paragraph (c)(31), by removing paragraph (d) and by redesignating existing paragraph (e) as paragraph (d) to read as follows:

§ 90.103 Radiolocation Service.

* * * * *

(b) * * *

Radiolocation Service Frequency Table

Frequency or band	Class of Station	Limitation
-------------------	------------------	------------

* * * * *

Megahertz:

* * *

902 to 928	do	31
------------------	----------	----

* * * * *

(c) * * *

(31) The 902-928 MHz band is available for LMS operations in accordance with section 90.105. Operations will not cause interference to government stations which operate in these bands and must tolerate interference from industrial, scientific, and medical (ISM) devices and from government stations which operate in these bands.

* * * * *

5. A new Section 90.105 is added to subpart F to read as follows:

§ 90.105 Location and Monitoring Service

(a) These provisions authorize the licensing of systems in the location and monitoring service (LMS). LMS systems utilize nonvoice radio techniques to determine the location and status of radiolocation units. LMS licensees authorized to operate a system in the 902-928 MHz band may serve individuals, federal government agencies and entities eligible for licensing in Part 90.

(b) Frequencies for LMS operations are assignable as follows:

(1) Only LMS systems using pulse-ranging technology requiring at least 2 MHz but not more than 8 MHz bandwidth will be authorized in the 904-912 MHz and 918-926 MHz bands. Such systems will be licensed subject to the following conditions:

(i) A licensee authorized a station on either 8 MHz band will not be authorized a station on the other 8 MHz band if the station to be authorized is located within 64 km (40 miles) of a station authorized to the licensee on the first band.

(ii) Operations will not cause interference to government stations which operate in these bands and must tolerate interference from industrial, scientific, and medical (ISM) devices and from government stations which operate in these bands.

(iii) Licensees operating in the 904-912 MHz band are authorized to operate in the 924.890-925.140 MHz band and licensees operating in the 918-926 MHz band are authorized to operate in the 904.375-904.625 MHz band for the purpose of communicating with units being located.

(2) LMS systems not eligible for licensing in the 904-912 MHz and 918-926 MHz bands will be licensed in the 902-904, 912-918, and 926-928 MHz bands. Operations will not cause interference to government stations which operate in these bands and must tolerate interference from industrial, scientific, and medical (ISM) devices and from government stations which operate in these bands.

(3) Applicants requiring not more than 25 kHz bandwidth per frequency in the 25-50 MHz, 150-170 MHz, and 450-512 MHz bands may either utilize base-mobile frequencies presently assigned the applicant, or be assigned base-mobile frequencies available in the service in which eligibility has been established, provided that:

(i) For transmission between vehicles and base stations, each frequency in a single-frequency mode of operation will provide location data for approximately 200 vehicles, or both frequencies in a two-frequency mode of operation will provide location data for approximately 400 vehicles, except that for frequencies in the 450-512 MHz band that are assigned in pairs in accordance with the allocation plan for the band, the requirement is that location data be provided for approximately 200 vehicles for each frequency pair; and a showing is made that 50 percent of the vehicles will be in operation within the system by the end of the second year of the initial license term, and 70 percent will be in operation within the system by the end of the initial license term; except that if these vehicle loading standards will not be met, frequencies will be assigned only on a secondary noninterference basis to any authorized radiotelephony operation.

(ii) The minimum separation between a proposed LMS station and the nearest co-channel base station of another licensee operating a voice system is 75 miles (120 km) for a single frequency mode of operation or 35 miles (56 km) for a two-frequency mode of operation. Where the minimum mileage separation cannot be achieved, agreement

to the use of F1D, F2D, G1D, G2D or P0N emission must be received from all existing co-channel licensees using voice emissions within the applicable mileage limits. If there is interference with voice operations and required agreement was not received, or operation was authorized on a secondary noninterference basis, the licensee of the LMS system is responsible for eliminating the interference.

(iii) Frequencies additional to any assigned under paragraph (b)(3)(i) of this section will not be assigned to the same licensee at any stations located within 64 km (40 miles) of any station in which the licensee holds an interest until each of such licensee's frequencies for LMS operation is shown to accommodate not less than 90 percent of the frequency loading requirements specified in paragraph (b)(3)(i) of this section.

(c) Each application to license an LMS system shall include the following supplemental information:

(1) A detailed description of the manner in which the system will operate, including a map or diagram.

(2) For wide-band frequency operation, the necessary or occupied bandwidth of emission, whichever is greater.

(3) The data transmission characteristics as follows:

(i) The vehicle location update rates;

(ii) Specific transmitter modulation techniques used;

(iii) For codes and timing scheme: A table of bit sequences and their alphanumeric or indicator equivalents, and a statement of bit rise time, bit transmission rates, bit duration, and interval between bits;

(iv) A statement of amplitude-versus-time of the interrogation and reply formats, and an example of a typical message transmission and any synchronizing pulses utilized.

(4) A plan to show implementation schedule during the initial license term.

(d) LMS stations are exempted from the identification requirements of § 90.425; however, the Commission may impose automatic station identification requirements when determined to be necessary for monitoring and enforcement purposes.

(e) All instruction manuals, operator manuals, and brochures for an LMS device must display the following warning:

§ 90.205 Power.

(b) * * *

Frequency range (megahertz)	Maximum Output power (watts)	Maximum effective radiated power (watts)
* * * * *		
902-928	300 (13)
* * * * *		

This device complies with Part 90 of the FCC Rules. Operation is subject to the following conditions: (1) this device may not cause harmful interference to Federal Government operations using this spectrum and (2) this device must accept any interference received from Federal Government operations and from Industrial, Scientific, and Medical devices using this spectrum, including interference that may cause undesired operation.

6. Section 90.179 is amended by revising paragraph (f) to read as follows:

§ 90.179 Shared use of radio stations.

* * * * *

(f) Above 800 MHz, shared use on a for-profit private carrier basis is permitted only by SMR, Private Carrier Paging, and LMS licensees. See Subparts F, P, and S of this part.

7. Section 90.203 is amended by adding new paragraph (b)(7) to read as follows:

§ 90.203 Type acceptance required.

* * * * *

(b) * * *

(7) Transmitters used in LMS systems in the 902-928 MHz band authorized prior to [effective date of rules].

* * * * *

8. Section 90.205(b) is amended by adding the 902-928 MHz band to the table and by adding footnote (13) to read as follows:

13 Effective radiated power shall be measured as peak power.

* * * * *

9. Section 90.209 is amended by adding new paragraphs (b)(10) and (m) to read as follows:

§ 90.209 Bandwidth limitations.

* * * * *

(b) * * *

(10) The maximum authorized bandwidth shall be 8 MHz and the minimum authorized bandwidth shall be 2 MHz for LMS operations in the bands 904-912 and 918-926 MHz. The maximum authorized bandwidth shall be 2 MHz for LMS operations in the bands 902-904 and 926-928 MHz. The maximum authorized bandwidth for LMS systems operating in the band 912-918 shall be 6 MHz.

* * * * *

(m) For transmitters authorized under Subpart F that operate in the 902-928 MHz band the peak power of any emission shall be attenuated below the power of the highest emission contained within the authorized channel bandwidth in accordance with the following schedule:

(1) On any frequency within the authorized bandwidth: Zero dB.

(2) On any frequency outside of the authorized bandwidth: $55 + 10\log(P)$ dB where (P) is the highest emission (watts) of the transmitter inside the authorized bandwidth.

(3) The resolution bandwidth of the instrumentation used to measure the emission power shall be 100 kHz. If a video filter is used, its bandwidth shall not be less than the resolution bandwidth.

(4) Emission power (P) shall be measured in peak values.

10. Section 90.213 is amended by adding the 902-904, 904-912, 912-918, 918-926, and 926-928 MHz bands to the table in paragraph (a) to read as follows:

§ 90.213 Frequency tolerance.

(a) * * *

Frequency range	Frequency Tolerance			
	Fixed and base stations		Mobile stations	
	Over 200W output power	200 w or less output power	Over 2W output power	2W or less output power
* * * * *				
902-904	(14)	(14)	(14)	(14)
904-9120005	.0005	.0005	.0005
912-918	(14)	(14)	(14)	(14)
918-9260005	.0005	.0005	.0005
926-928	(14)	(14)	(14)	(14)
* * * * *				

11. Section 90.239 is removed and reserved.